PARADYNE®

SIM2000-24 SDSL Inverse Multiplexer

Installation Instructions

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To order a paper copy of a Paradyne document, or to speak with a sales representative, please call 1-727-530-2000.

Release Notes

Release notes for this product are available in the subscriber firmware area of **www.paradyne.com**. Select *Support* → *Subscriber Firmware*.

Always review the relevant release notes before installing a new card.

Unpacking the SIM2000-24

HANDLING PRECAUTIONS FOR STATIC-SENSITIVE DEVICES

This product is designed to protect sensitive components from damage due to electrostatic discharge (ESD) during normal operation. When performing installation procedures, however, take proper static control precautions to prevent damage to equipment. If you are not sure of the proper static control precautions, contact your nearest sales or service representative.

Unpack and inspect the SIM2000-24. If there is visible damage, do not attempt to connect the device; contact your sales or service representative.

Installation in a 4000 or 12000 BAC

There must be a Multiplexer Uplink Module (MUM) installed in the Broadband Access Concentrator (BAC) in order for interface modules to operate.

- The 12000 and 12000E BACs are fourteen slot chassis. Slots 1–12 are reserved for interface modules (such as the AIM24000), and the remaining slots (13 and 14 in the 12000 and U1 and U2 in the 12000E) are reserved for management modules.
- The 4000 BAC is a five slot chassis; slots 1–4 are reserved for interface modules and slot 5 is reserved for a MUM.

Interface modules are hot swappable. Installing or removing an interface module while the chassis is powered up does not affect the operational status of other interface modules within the chassis.

▶ Procedure

1. Align the SIM2000-24 with the slot module guides of the chosen slot for installation (slot 1–12 in the 12000 and 12000E or slot 1–4 in the 4000 and 4000E).
2. Slide the SIM2000-24 into the chassis. Do not use excessive force.
3. Secure the SIM2000-24 by tightening the fastening screws on the module faceplate.
4. Verify that the PWR (Power) LED on the SIM2000-24 faceplate is illuminated.

Connecting the SDSL Line

Plug the SDSL cable RJ21 connector into the corresponding RJ21 port on the back of the IP DSLAM. For most applications, a SIM2000-24 SDSL link requires a straight-through cable. The SIM2000-24 can be connected with a remote SDSL subscriber unit via either a single SDSL line or double SDSL lines (loop bonding). For each port being connected to a remote SDSL subscriber unit, verify that the SDSL link has been established: the SDSL LK LED for that port will pulse green to indicate the connection has been made. Link up time can vary from one to five minutes depending on the quality, gauge and distance of the copper cables.

Table 1. SDSL RJ21 Pinouts

Port	Connector Pins (Ring, Tip)	Port	Connector Pins (Ring, Tip)
Port 1	1, 26	Port 13	13, 38
Port 2	2, 27	Port 14	14, 39
Port 3	3, 28	Port 15	15, 40
Port 4	4, 29	Port 16	16, 41
Port 5	5, 30	Port 17	17, 42
Port 6	6, 31	Port 18	18, 43
Port 7	7, 32	Port 19	19, 44
Port 8	8, 33	Port 20	20, 45
Port 9	9, 34	Port 21	21, 46
Port 10	10, 35	Port 22	22, 47
Port 11	11, 36	Port 23	23, 48
Port 12	12, 37	Port 24	24, 49

Pins 25 and 50 are not used.

Loop Bonded SDSL Connection

Using two SDSL lines for one network connection (loop bonding) will net twice the speed and data passing capability as a single-line SDSL connection. A second SDSL line can also be considered a backup for the first, and vice versa, should either line become disabled. Any two SIM2000-24 ports (consecutive or not) may be connected to an SNE2020-S or SNE2020G-S subscriber unit to establish a loop bonded connection.

NOTE: Any ports on the SIM2000-24 intended for a loop bonded connection with an SNE2020-S or SNE2020G-S should be identically configured prior to connection. Bonding ports with different configurations will likely result in misplaced, misdirected, or dropped data. See the NMS Management User Guide or the CLI and SNMP Management User Guide for configuration instructions. If default settings are to be used for both ports, then prior configuration is not necessary and you may proceed with installation.

Single Line SDSL Connection

A single line connection can be established between a SIM2000-24 and any of Paradyne's SDSL subscriber units.

Bandwidth and Line Code

There are nine bandwidth options for SIM2000-24 SDSL connections. Distance capabilities vary, dependent upon the type of line code being utilized. The defaults are TC/PAM line encoding (G.SHDSL) at 272 kbps. See *SIM2000-24 Parameters* on page 9 for more detailed information regarding bandwidth and line code.

Default Settings

No configuration is necessary for the SIM2000-24 to operate at default settings.

Table 2. SIM2000-24 Default Settings

Configuration Option	Default
Backbone-VLAN	0 (off)
Circ. ID (Circuit Indentification)	n/a (no default)
Flood	Upl (Uplink)
IP Range 1	0.0.0.0 – 255.255.255.255
IP Range 2	0.0.0.0 – 0.0.0.0
Line Code	TC/PAM (G.SHDSL)
Pri (VLAN Priority)	0 (none)
Protocol	All
Speed:	272 kbps
VLAN Ranges (1–10)	0 – 0 (off)

SIM2000-24 Management

Once the SIM2000-24 has been installed, line code, bandwidth and all other configurations are software selectable. Dependent upon the MUM model installed in your DSLAM, the SIM2000-24 can be configured via the Command Line Interface (CLI), Simple Network Management Protocol (SNMP), or the web-based Network Management System (NMS). For further information regarding SIM2000-24 management and configuration please refer to the NMS, CLI, and SNMP User's Guides.

Management Via the NMS

The Network Management System (NMS) is an embedded web server in certain models of IP DSLAM MUMs. This web server maintains statistical and configuration data for the SIM2000-24 and includes a scaled-down version of Simple Network Management Protocol (SNMP v1.0).

NOTE: If your IP DSLAM is newly installed and has not yet been set up for management access, you must configure the IP address, subnet mask and default gateway (via the NMS or CLI) before you will be able to access data or complete any other configurations. See the NMS, CLI, or SNMP User's Guide for initial configuration instructions.

▶ Procedure

1. Establish a connection with your IP DSLAM MUM either directly (through the Ethernet RJ45 MGMT Port on the MUM faceplate) or, if the system has been so configured, from a PC on your local network. For direct connections, verify that the MGMT LNK LED on the MUM faceplate is illuminated (indicating the connection has been established).
2. Launch a web browser on your PC such as Microsoft Internet Explorer (version 4.0 or higher) or Netscape Navigator (version 4.0 or higher).
3. Enter the DSLAM's IP address into the address field at the top of your browser window. Press the Enter key.
4. Log in with your assigned username and password. (Note that General users have read-only access; for SIM2000-24 configuration you must log in as a Superuser.)

Once you have logged in as a Superuser, you may make configuration changes to the SIM2000-24, and any other interface modules installed in the IP DSLAM, as desired. For more detailed information regarding SIM2000-24 parameters and configuration, refer to *SIM2000-24 Parameters* on page 9, or the NMS Management User Guide.

Management Via the CLI

Interface modules in an IP DSLAM with a Command Line Interface (CLI) compatible MUM can be managed with a terminal emulation program loaded onto your PC using commands entered at a command prompt.

▶ Procedure

1. Establish a direct connection between the serial port of your PC and the MUM through the RS232 COM Port on the MUM faceplate.
2. Launch a terminal emulation program on your PC.
3. Log in with your assigned username. Once your username has been entered, a request for password will appear. For SIM2000-24 configuration you must log in as a Superuser.

Once you have logged in as a Superuser, you may make configuration changes to the SIM2000-24 and any other interface modules installed in the IP DSLAM. For more detailed information regarding SIM2000-24 parameters and configuration, refer to *SIM2000-24 Parameters* on page 9, or the CLI or SNMP User's Guides.

Management Via SNMP

Simple Network Management Protocol (SNMP) is the standard for management of Transmission Control Protocol/Internet Protocol (TCP/IP) networks and network devices. Interface modules in an IP DSLAM with an SNMP compatible MUM can be managed with a MIB Browser program (loaded onto your PC) via a set of Object Identifiers (OIDs). OIDs are strings of numbers specifying various configuration commands and requests for data.

NOTE: If your IP DSLAM is newly installed and has not yet been set up for management access, you must configure the IP Address, Subnet Mask and Gateway (via either NMS or CLI) before you will be able to utilize SNMP. See the SNMP User's Guide for initial configuration instructions.

▶ Procedure

1. Establish a connection with the MUM either directly (through the Ethernet RJ45 MGMT port on the MUM faceplate) or, if the system has been so configured, from a PC on your local network. For direct connections verify that the MGMT LNK LED on the MUM faceplate is illuminated (indicating the connection has been established).
2. Launch a MIB Browser program on your PC. If you have not yet downloaded the MIBs to your PC or local network, you can obtain the Paradyne enterprise MIBs from ftp://ftp.nettonet.com/download/mibs and the supported portions of MIB-II from RFC 1213 at http://www.ietf.org/rfc.html . Once these have been downloaded, you will need to compile them into your MIB Browser. See your MIB Browser user manual for further instruction.

Once the MIBs have been downloaded, you will be able to make configuration changes to the SIM2000-24 and any other interface modules installed in the IP DSLAM. For more detailed information regarding SIM2000-24 parameters and configuration, refer to *SIM2000-24 Parameters* on page 9, or the SNMP User's Guide.

SIM2000-24 Parameters

Parameters common to all interface module models are defined in both the NMS Management User's Guide and the SNMP User's Guide. Parameters specific to the SIM2000-24 are outlined below.

Line Code

Line code configuration for the SIM2000-24 applies to all ports; individual ports cannot be configured with different line codes.

- TC/PAM (Default) – Transmission Convergence/Pulse Amplitude Modulation (TC/PAM) line code is a sixteen-level PAM technique which incorporates advanced trellis code, precoding, spectral shaping, equalization circuits and forward error correction. Also known as G.SHDSL.
- CAP – Carrierless Amplitude and Phase (CAP) line code modulates transmit and receive signals into two wide-frequency bands that can pass through a filter without being attenuated.
- 2B1Q – Two Binary, One Quaternary (2B1Q) line code is a four-level Pulse Amplitude Modulation (PAM) technique which reduces the signaling rate to half of the bit rate, thereby doubling transmission efficiency.

Speed

There are nine bandwidth options for SIM2000-24 SDSL connections. The default is 272 kbps. Distance capabilities vary, depending upon the type of line code being utilized. Distances listed below assume the use of 26 American Wire Gauge (AWG) cable. Connections made with cable of a greater gauge will link up at greater distances. The units may not link up if the cable is in poor condition or if the cable distance is greater than a particular bandwidth will support.

Remote SDSL subscriber units determine line speed through their communication with the SIM2000-24.

Table 3. SDSL Distance Capabilities

BANDWIDTH	kbps	2,320	2,064	1,552	1,040	784	528	400	272	144
G.SHDSL Distance	Feet	11,300	12,200	12,800	16,000	16,800	18,400	19,400	20,200	25,400
	Meters	3,444	3,719	3,901	4,877	5,121	5,608	5,913	6,157	7,742
CAP Distance	Feet	11,000	11,900	12,600	15,500	16,000	17,900	18,900	23,100	24,700
	Meters	3,353	3,627	3,840	4,724	4,877	5,456	5,761	7,041	7,529
2B1Q Distance	Feet	10,400	10,800	13,400	14,800	15,800	17,400	18,200	19,200	23,800
	Meters	3,170	3,292	4,084	4,511	4,816	5,304	5,547	5,852	7,254

RAM and NVRAM

Configuration backup is inherent in the SIM2000-24. Upon initial power-up of the IP DSLAM, default parameters of the SIM2000-24 will remain in place unless changed through the NMS, CLI, or SNMP. Once changed, new configurations will automatically be recorded in both the Random Access Memory (RAM) of the SIM2000-24 and the Non-Volatile Random Access Memory (NVRAM) of the MUM. While data stored in SIM2000-24 RAM will be erased if the module is removed from the IP DSLAM or the IP DSLAM loses power, interface module data stored within MUM NVRAM will remain intact, even if the unit loses power, unless deliberately cleared or reconfigured.

Configuration Backup and Restore

Individual port configurations can be saved locally on your PC as a backup, and/or for use as a template for future configurations. Once the SIM2000-24 has been configured as desired, the settings can be uploaded through a Trivial File Transfer Protocol (TFTP) tool with a GET command and the following information:

- Host name: [IP DSLAM IP Address]
- Remote filename: NVR_CFG.bin.[superuser password]
- Local filename: [user preference]

Port configuration files can be downloaded from a local file to a SIM2000-24, using the SET command.

NOTE: Only individual port configurations can be saved to a local file. Chassis configurations cannot be uploaded or downloaded; they must be manually configured for each unit.

LED Indicators

Table 4. LED Indicators

LED	STATE	INDICATION	ADDITIONAL INFORMATION
PWR (Power)	Solid green	SIM2000-24 is operational	If the Power LED is not illuminated, it is unlikely the SIM2000-24 is receiving power. None of the LEDs will be illuminated.
SDSL LK (Link)	Pulsing green*	SDSL connection is established and active	The SDSL link is operational and traffic is flowing.
	Solid green	Problematic SDSL connection	A connection exists but there is indication of a problem with the SDSL line.
	No illumination	No SDSL connection	
SDSL RX (Receiving)	Flashing amber	SDSL activity	The port is receiving either data from the remote SDSL subscriber unit or statistical packets from the IP DSLAM management.
	Solid amber	Heavy Rx traffic	The port is receiving large amounts of data from the remote SDSL subscriber unit.
	No illumination	No activity	A link may exist but the port is not receiving any data from the remote SDSL subscriber unit.
SDSL TX (Transmitting)	Flashing amber	SDSL activity	The port is transmitting data to the remote SDSL subscriber unit.
	Solid amber	Heavy Tx traffic	The port is transmitting large amounts of data to the remote SDSL subscriber unit.
	No illumination	No activity	A link may exist but the port is not transmitting any data to the remote SDSL subscriber unit.

* A pulsing LED blinks steadily at a rate of once per second. A flashing LED blinks at a more rapid, less constant rate.

Regulatory Compliance for Class A Equipment

US Federal Communications Commission (FCC)

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution: Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Industry Canada

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du Canada.

Europe

This Class A product complies with European Norm EN55022.

Caution: In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures to correct the situation.

⚠ Important Safety Instructions

⚠ UNITED STATES – EMI NOTICE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The authority to operate this equipment is conditioned by the requirements that no modifications will be made to the equipment unless the changes or modifications are expressly approved by Paradyne Corporation.

⚠ CANADA – EMI NOTICE:

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Cet appareil numérique de la classe A respecte toutes les exigences du règlement sur le matérial brouilleur du Canada.

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- **Telephone:** Call our automated system to receive current information by fax or to speak with a company representative.
  - — Within the U.S.A., call 1-800-870-2221
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